

REMARKS

Claims 1-22 are pending in this application. In the Office Action, claims 3, 4 and 10-22 were withdrawn from consideration as being directed to a non-elected invention; and claims 1, 2 and 5-9 are rejected under prior art.

By this Amendment, claim 1 is amended. The amendment to claim 1 is a non-narrowing amendment, made for clarifying purposes only and not to overcome any prior art. No new matter is added.

Objection to the Drawings

The Office Action objected to the drawings under 37 C.F.R. § 1.83(a). In particular, the Examiner stated that the “lower electrode height and first metal thickness being substantially identical” must be shown or canceled under claims. The objection is respectfully traversed.

Applicants respectfully submit that the drawings, for example, Figs. 2, 3d-3f and 4b-4d depict the height of the lower electrode 126 being *substantially* identical to the first metal wire 122. In other words, the height of the lower electrode 126 commences at the lower surface of first layer 120 up to the surface of the lower layer 124a of the second layer 124, and the thickness of the metal wiring 122 commences at the lower surface of first layer 120 up to the lower layer 124a of the second layer 124. Accordingly, the drawings clearly depict the lower electrode height and the first metal thickness being substantially identical, as recited in claim 1. Reconsideration and withdrawal of the rejection are respectfully requested.

Objection to the Specification

The Office Action objected to the title as being not descriptive. Applicants respectfully traverse the objection as the title is adequately described. That is, Applicants' invention is generally related to a "semiconductor device and manufacturing thereof", and hence the title accurately reflects the invention. In fact, the claims recite a "semiconductor device" which also clearly provides an accurate reflection of the invention. Further, the USPTO cannot object to the title in which Applicant broadly describes the invention, for instance, a brief search in the USPTO database of patents resulted in 19,740 patents that include "semiconductor device" in the title. Thus, it is respectfully requested to reconsider and withdraw the objection.

The Office Action objects to claims 1, 2 and 5-9 due to minor informalities. By this Amendment, claim 1 has been amended to obviate the objection. Applicants submit that this amendment is non-narrowing in scope, and is not related to reasons of patentability. Accordingly, withdrawal of the objection is respectfully requested.

Claim Rejection – 35 U.S.C. §112, 1st Paragraph

The Office Action objects to claim 2 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner alleges that "there is no support in the disclosure and the drawings for a first insulating layer formed on the cell array region and the peripheral circuit region and having openings in which the lower electrode is formed, and a second insulating layer formed on the first insulating layer, as recited in claim 1, wherein a first conductive plug extending through the first insulating layer to connect the lower electrode to the semiconductor substrate, as recited in claim 2". However, Applicants respectfully traverse the rejection.

In particular, claim 1 has been amended to disclose that the “first insulating layer...having openings”. Support for the amended claim can be found, for example, in Fig. 2, which depicts openings 114a and 114b. The amendment is non-narrowing in scope, and is not related to reasons of patentability.

With regards to claim 2, it is submitted that the instant disclosure adequately describes “a first conductive plug extending through the first insulating layer to connect the lower electrode to the semiconductor substrate”, for example, Fig. 2 discloses a first conductive plug 116A extending through the first insulating layer 112 connected to the lower electrode 126 to the semiconductor substrate 110.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim Rejection – 35 U.S.C. §112, 2nd Paragraph

The Office Action rejects claims 1, 2 and 5-9 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The rejection is respectfully traversed.

As similarly discussed above, claim 1 has been amended to clearly and distinctly claim the subject matter. The amendment is non-narrowing in scope, and is not related to reasons of patentability.

With regard to the “lower electrode height and the first metal thickness are substantially identical”, it is submitted that the device of the lower electrode 126 and metal pattern wirings 122 have substantially the same height in layer 120 (e.g., second layer), as shown in Fig. 2, for example.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim Rejection – 35 U.S.C. § 103

Claims 1, 2 and 5-9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okumura et al. (hereinafter “Okumura”), U.S. Patent 6,163,046. The rejection is respectfully traversed.

Applicants’ claim 1 recites, *inter alia*, a capacitor having a lower electrode, the lower electrode having a lower electrode height...a first insulating layer formed on the cell array region and the peripheral circuit region having openings ...wherein the lower electrode height and the first metal thickness are substantially identical.

As an example, non-limiting embodiment, Fig. 2 illustrates a substrate 100 divided into a first region A (cell array region) and a second region B (core/peripheral circuit/logic region). An insulating layer 112 is then formed on the substrate 100. A first storage node contact hole 114a (opening) and a first bit line contact hole 114b (opening) are formed through the insulating layer 112 to expose the substrate 100. The contact holes 114a and 114b are filled with plugs 116a and 116b. First metal wirings 122 (first metal wiring) may be formed on the insulating layer 112 in the second region B to make contact with the metal plug 116c. Capacitors 132 may be formed on the insulating layer 112 in the first region A to make contact with plug 116a. The capacitor 132 may include *a lower electrode* 126, a dielectric layer 128 and an upper electrode 130 making up a metal/insulator/metal (MIM) structure. Referring to Fig. 2, the height of the lower electrode 126 may be substantially the same as the thickness of the first metal wirings 122 in insulating layer 120.

Okumura fails to disclose or suggest a capacitor having a lower electrode, the lower electrode having a lower electrode height, as recited in claim 1.

In fact, Okumura is completely silent with regard to the lower electrode. Instead, Okumura merely discloses portions of the insulating film located on the bottom surface films

16 called cylindrical capacitor forming insulating films 26 (Figs. 10A and 10B). A storage node forming conductor film is formed along the overall surface, and selectively removed by etchback left in the portions around the bottom surface film 16 and the cylindrical capacitor forming insulating films 26. The bottom surface films 16 and side surface films 17 form the storage nodes SN (col. 14, line 55 - col. 15, line 5). In other words, Okumura may disclose a capacitor, however the device of Okumura does not disclose having a lower electrode.

Accordingly, Okumura fails to disclose or suggest a capacitor having a lower electrode, a lower electrode having a lower electrode height, as recited in claim 1.

Further, as Okumura fails to disclose a capacitor having a lower electrode, Okumura further cannot teach “the lower electrode height and the first metal thickness are substantially identical”, as recited in claim 1.

The Examiner alleges, on page 6 in the Office Action, that “it would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the lower electrode height and the first metal thickness substantially identical in Okumura’s device in order to improve the characteristics of the device by routine optimization and experimentation”. However, it is respectfully submitted that the mere fact that the reference of Okumura can be modified as suggest by the Examiner is not sufficient by itself to establish a *prima facie* case for obviousness. The Examiner’s motivation is not particularly clear, rather, it is a broad conclusory statement about the teachings of the reference, and is not evidence. Moreover, this motivation does not show that the modification of Okumura is desirable which is required to serve as proper motivation. Thus, the Examiner has failed to provide a *prima facie* case for obviousness, and thus the rejection should be withdrawn.

For at least these reasons, Applicants respectfully submit that Okumura fails to disclose or render obvious the features recited in independent claim 1. Claims 2 and 5-9,

which depend from independent claim 1 are likewise distinguished over the applied art at least for the reasons discussed as well as for the additional features they recite. Reconsideration and withdrawal of the rejection are respectfully requested.

CONCLUSION

Accordingly, in view of the above amendments and remarks, reconsideration of the objections and rejections and allowance of each of claims 1-22 in connection with the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By

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